air west

The DC-9 Story

WEST COAST AIRLINES

a view of tomorrow

Less than a year from now the first West Coast Airlines DC-9 will be delivered. When it enters scheduled service shortly thereafter, the fanjet will mark the beginning of a new age of local airline service in the Pacific Northwest.

This special edition of Air West will give you, our fellow employees, customers, and friends, a preview of this exciting event . . . the launching of pure jet service on the West Coast system.

When you mention the word "jet", you automatically think of speed. While the speed the DC-9 will bring to travel over our routes is one of the new airplane's most significant features, this is only part of the DC-9 story. Because of its size and fine interior appointments, our new jet will offer customers a level of relaxed in-flight comfort never before available on short distance flights.

For the first time, a West Coast Airlines passenger will be able to fly across the country and on to his ultimate destination at a city receiving DC-9 service with no "change of gauge" in terms of the aircraft he flies in. His long distance and his short haul flights will be in airplanes of comparable size, convenience, and performance. We in the local airline industry have waited almost twenty years for this dream to materialize.

Despite the enviable reliability of our F-27's, the DC-9 will greatly exceed this mark. Its inherent simplicity and maintenance-free design will enable us to achieve greater utilization of the airplane and yet continue to assure the passenger of routine on-time flights.

The all-weather landing system with which the DC-9 will come equipped will help dispel the uncertainties of winter operation. When the majority of our

airports are so equipped that we can utilize the low visibility system, even greater schedule reliability will result.

There are a myriad of other features that an airplane like the DC-9 will offer our passengers. Things like the ability to provide full hot meal service when required. The inauguration of one-plane through service between some of the more distant city-pairs on our system. The marked increase in air cargo capacity that will be available. Not to mention the sheer fascination of flight in a modern swept wing airliner like the new Douglas jet.

We invite you now to join Captain Patrick O'Grady and stewardess Ann Clarke for a preview of our new airplane in the pages that follow. Don't be surprised if you become as thrilled and excited about it as we are.

THE DC-9 STORY

from douglasland

Scene: Douglasland, a modern flying machine factory in Southern California.

Principal characters: Captain Patrick E. O'Grady, perky, red-haired aviator with smiling Irish eyes, a West Coast Airlines senior pilot. Ann Clarke, pert, pretty, petite West Coast hostess. The DC-9, a sleek new twinjet airliner, also pert and pretty, with a warm blonde personality all its own.

Cast of thousands, including engineers, designers, draftsmen, toolmakers, machinists, mechanics, welders, riveters, assemblers, electricians, painters, inspectors, public relations and camera men.

Synopsis: Captain O'Grady and Miss Clarke visit Douglas Aircraft Division at Long Beach for a preview of the DC-9, soon to bear the colors of West Coast Airlines. With eager anticipation they have come to make personal acquaintance with the jetliner they will later fly in service, to meet the people responsible for creating it and to tour the production line, learning about the DC-9 to the last rivet in its gleaming skin.

The setting is the Douglas flight line adjacent to the plant on the north side of Long Beach Airport, where two DC-9s are being prepared for their next series of tests in the air. The location is new to Ann, but not to Pat O'Grady.

Flashback: Another time, another uniform. It is November, 1943, and O'Grady has just attained his first rank of captain. Instead of a natty black airline pilot's jacket, he wears the olive drab of the U.S. Army Air Corps. His station is the Air Transport Command base on the southern perimeter of Long Beach Airport. Across the field are the big Douglas hangars, spewing transports and bombers for delivery to the fighting fronts.

Meanwhile, back at the Clarke family homestead in Longview, Washington, Ann Clarke is a tiny toddler in blonde curls. She hasn't yet entered school, let alone graduated to become a nurse for her doctor father and then an airline hostess.

Dissolve to the present, on the Douglas ramp where engineers swarm over the two DC-9s, checking mechanical equipment and the complicated testing gear inside. Together now in their West Coast uniforms, Ann and Pat share the infectious enthusiasm of the Douglas technicians.

Speed is written into every line of the DC-9, from the tip of its radar cone nose to the trailing toe of the swept-back tail. The graceful proportions give a deceptive impression of size. Pacing off the length, O'Grady is amazed.

"Bigger than she looks!" he tells Ann. "More than 100 feet, half again as long as our DC-3s." (And four times as fast, too.)

Measuring the wingspread is another surprise. This time the dimensions are reversed. Because the DC-9 wings sweep back for efficiency at jet speeds, they reach eight feet less than the 95-foot span of the smaller DC-3's straight wings.

From the top of the three-level work stand surrounding the towering T-tail, Ann and Pat gain new perspectives of their future teammate. From the rounded elevator control fairing atop the tall vertical stabilizer to the ground below the fanjet engines on both sides of the fuselage, the DC-9 stands proudly more than 27 feet tall.

As the visitors from West Coast Airlines stand within the affectionate embrace of its tapering wings, the DC-9 communicates by empathy. It speaks for itself in symmetry of line, the poetry of form and function.

Come fly with me, it seems to say. You know my breed. Ask anyone who has flown the long-range, four-engine DC-8. Those glowing reports of swift, smooth and luxurious travel are fact, not fiction. It's a world apart.

But maybe you travel mostly around the Pacific Northwest. And what about your flight to Seattle-Tacoma or San Francisco where you board the big transcontinental jets? Why not fanjet flights for the hometown traffic?

That's why I was born. You helped to design me. Your airline and others told the Douglas engineers half of all tickets are issued for trips of less than 400 miles. That's the kind of job I'm built to do, with 75 passengers at a time.

Take me up. Let me show you what flying is really like.

The silent soliloquy ends as the hostess and the pilot glance at each other with delighted smiles.

"The message is loud and clear," Pat tells Ann.

"She's quite a bird," Ann replies in pilot parlance. "Let's see how Douglas made her that way."

Silhouette sublime

Douglas' final assembly building measures a dozen DC-9 wingspans in length, four of them in width

The last step in assembly: the next move is to adjacent Long Beach Airport for takeoff. Signal Hill, oil derricks beyond

THE ASSEMBLY LINE

Thousands of large and small parts which constitute the twin-jet DC-9 transport flow like tributaries into a great river of final assembly at the Long Beach facility of the Douglas Aircraft Group.

At first glance, operations within the two massive commercial transport assembly buildings appear complex and confused to the two West Coast Airlines "tourists." The size of the buildings, alone, tends to tax their credulity. The larger of the two, used for structures assembly, is 1,144 feet long and 480 feet wide — only slightly less than the area covered by twelve football playing fields. The adjoining final assembly building is equally long but shy 120 feet in width.

Distinguishable in the cacophony are staccato bursts of riveting guns and the rumble of cranes straddling yellow tracks 60 feet overhead. Everywhere, apparently scattered at random, are metal forms on which men and women are working. There is a variety of color, from the silvery gleam of aluminum to brightly color-coded parts bins.

Color, in fact, is the first key to Pat O'Grady's comprehension of the activity. He learned that all parts for the DC-8, which is produced side-by-side with the DC-9, are assembled on jigs painted grey-green. Components for the DC-9 are held in peach colored jigs, the heavy steel forms which establish the shape and precise dimensions for each sub-assembly.

Little by little the orderliness of assembly becomes apparent.

The vast structures assembly building is divided into separate areas in which major parts of the airplane are built up. In larger areas, the major sub-assemblies are joined until the entire wing and the entire fuselage are substantially constructed.

In the Douglas assembly process, wings are produced in two halves which are joined at the center line of the fuselage. The two halves of the DC-9 wing are assembled by deHaviland of Canada near the city of Toronto, but they are joined at Long Beach on the same assembly line as the DC-8 wings which are produced from scratch in the same building.

Major sub-assemblies for the fuselage are the nose section, upper and lower halves of the cabin, cabin side panels, the tapered aft fuselage and tailcone with vertical stabilizer as a unit. Sub-assemblies are moved from position to position on a rigid time schedule in order to reach a joining position simultaneously. They are lifted into new locations by overhead crane until the growing structure becomes large enough to move on wheeled dollies.

Although a majority of the work is done by hand, some of the larger sections are riveted by automatic machines.

Once the large sheet of aluminum and the strengthening "stringers" are lined up in the machine - like a large piece of cloth on a sewing-machine table - the device takes over. It locates the correct spot, drills and countersinks a rivet hole, inserts and pounds the rivet, and cuts the head flush with the sheet. The large piece is then moved to the next position.

These machines, controlled by magnetized tape, can perform this operation more than seven times a minute and do a

better riveting job than human hands. An operator observes the work from beneath the moving sub-assembly, keeping an eye on what occurs on the upper side by means of closed circuit television.

Until the completed fuselage and the spreading wings are joined, a transport doesn't look much like an airplane. The act of joining wings to the fuselage, in fact, is a key step in the final assembly process. It is a "moment of truth" which assures everyone that the previous sub-assembly steps have been performed with the required degree of accuracy. A minuscule deviation earlier in the process would be aggravated along the line and a gross misfit result when the two massive pieces were brought together.

Miles of electrical wiring, yards of tubing, fiber-glass insulation and the many mechanical devices are installed at the point of assembly offering the easiest accessibility for installers.

Wiring usually is made up in cables of various lengths, with branches like tree limbs and twigs to reach the contact points in the plane. The shape of this completed cable is established originally by running each wire separately from one terminal to another in a skeleton airplane called a development fixture. After all the wires have been connected, in the fixture, they are bound together and removed as a cable. The first cable establishes the form, and all subsequent cables are assembled by following guide lines and pegs arranged to duplicate this form.

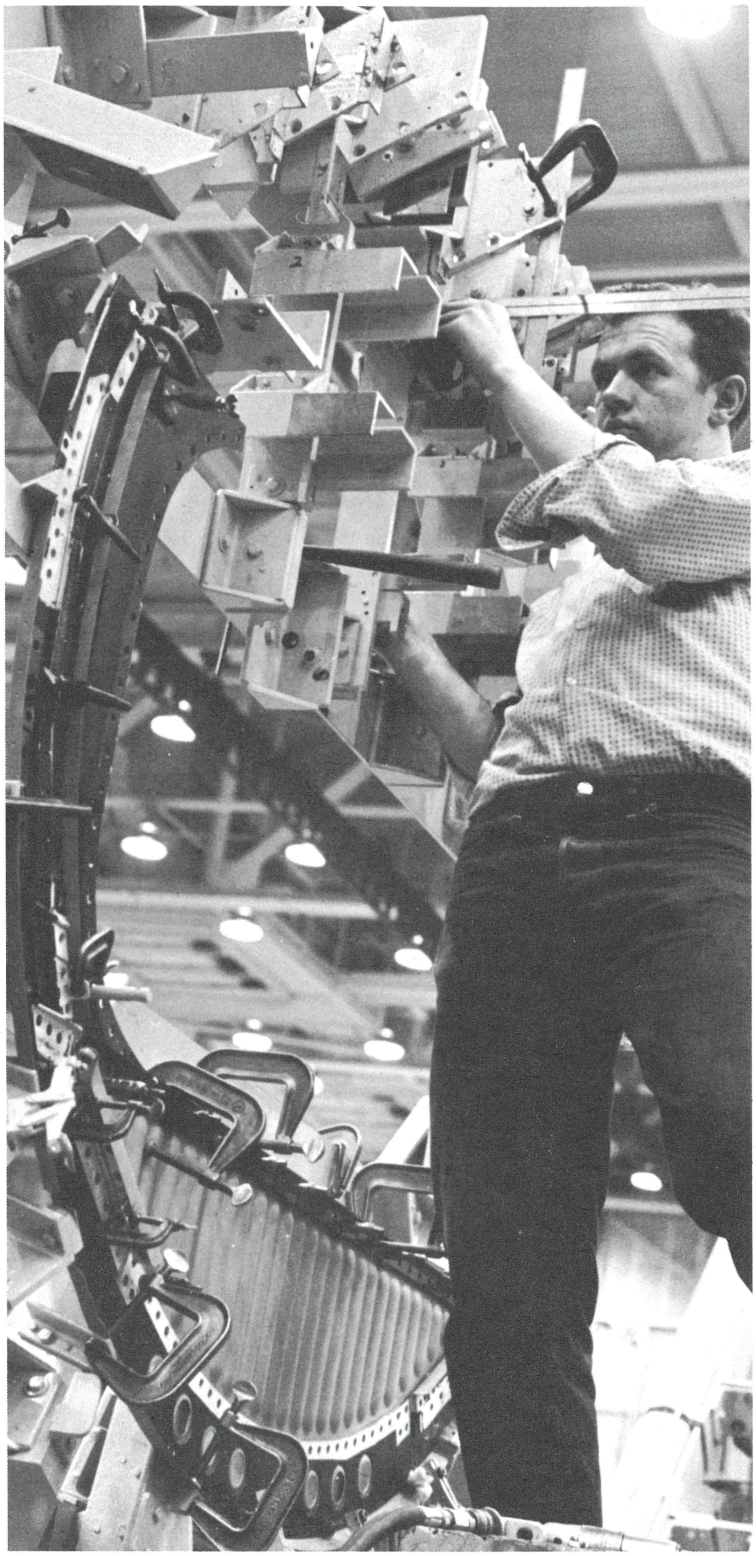
The development fixture, in which the original wires are strung, also is used to make initial installation of other electrical and mechanical devices required in a modern transport plane. It fascinated both Pat and Ann since it was, in effect, an airplane with the skin removed.

One of the final steps in assembly is the attaching of the powerful jet engines on the aft fuselage of the DC-9. As the DC-9s move closer to the final assembly position, movable portions of the wing and tail are added: the ailerons, flaps, rudder and the big, V-shaped horizontal stabilizer atop the tail. Interior finishers, meanwhile, busy themselves with cockpit and fuselage installations.

Time required for the entire assembly process depends upon the rate of production established to meet delivery commitments. The first DC-9 took one year to assemble, but completion time for each succeeding airplane diminishes as the flow of parts and sub-assemblies swells.

The first DC-9 for West Coast Airlines, scheduled for completion next June, will require only six months to assemble, and by then completed DC-9s will be rolling off the line at the rate of two per week. Delivery will take place during the first week of July, 1966, when West Coast Airlines strides confidently into the jet age.

Assembly begins on small scale



but always with precision

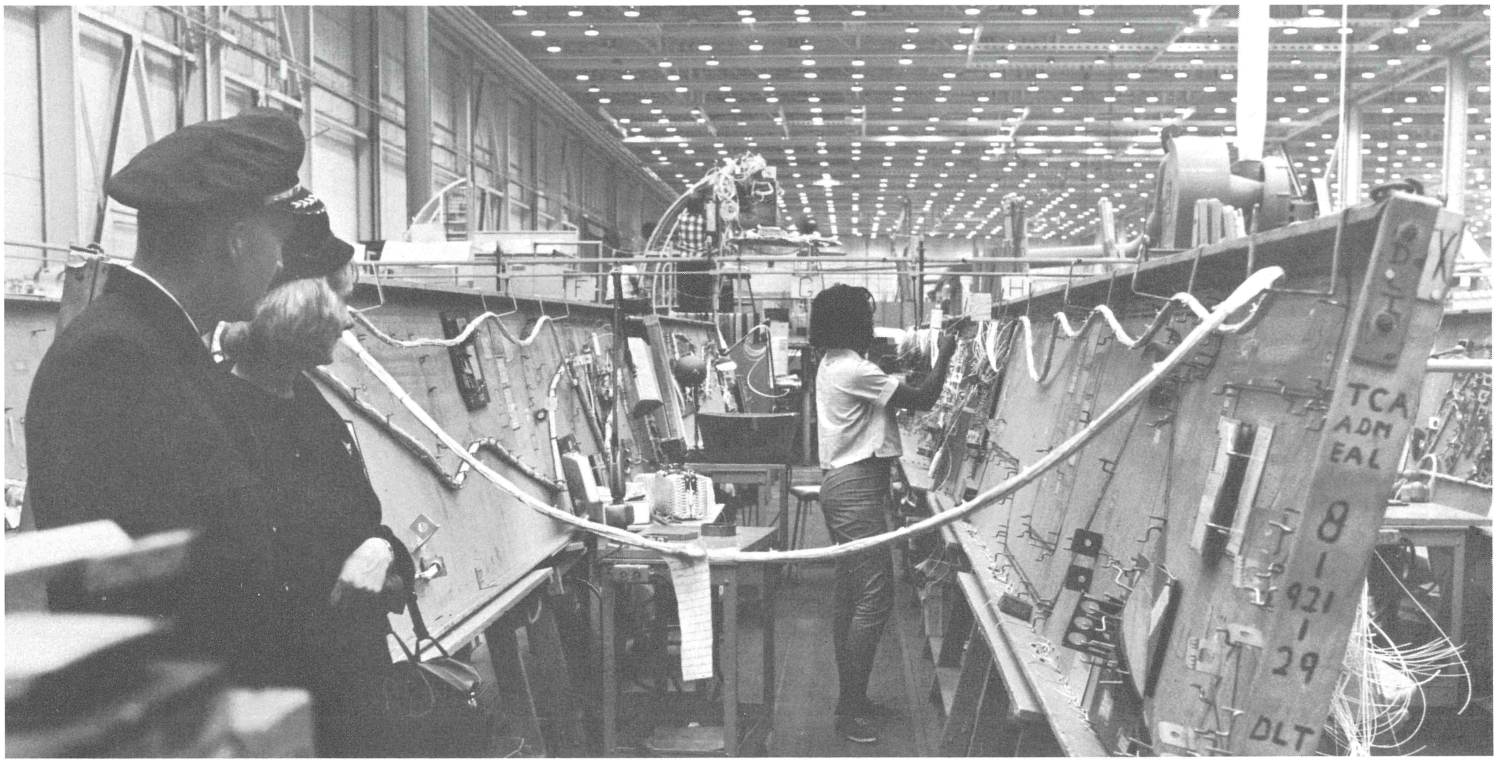
Embryo flight deck

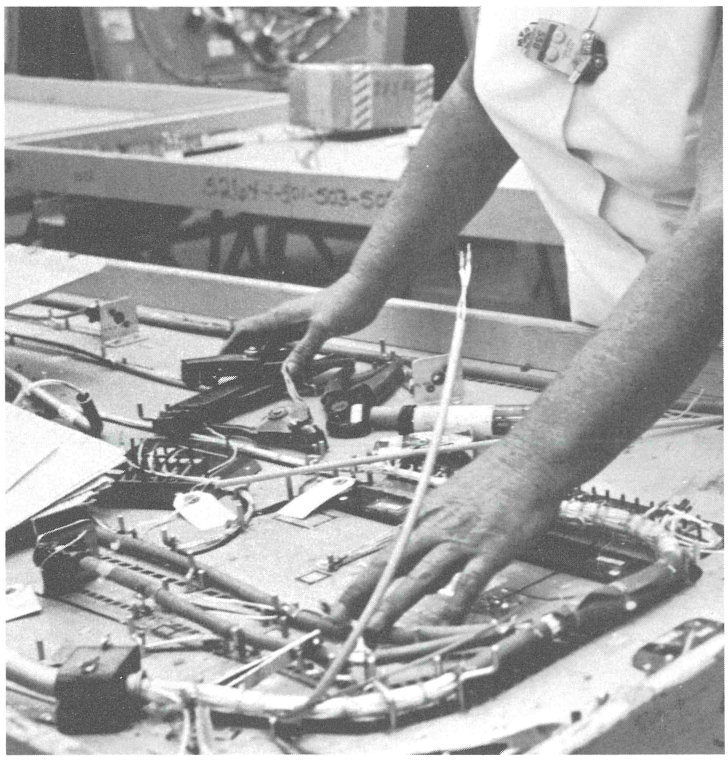
Circuit breaker panel

If an electronic malfunction occurs, the source can be identified and the trouble quickly isolated

Development fixtures serve as a fullscale model prior to start of production

Electrical cables are assembled by patterns based, in part, on development fixtures

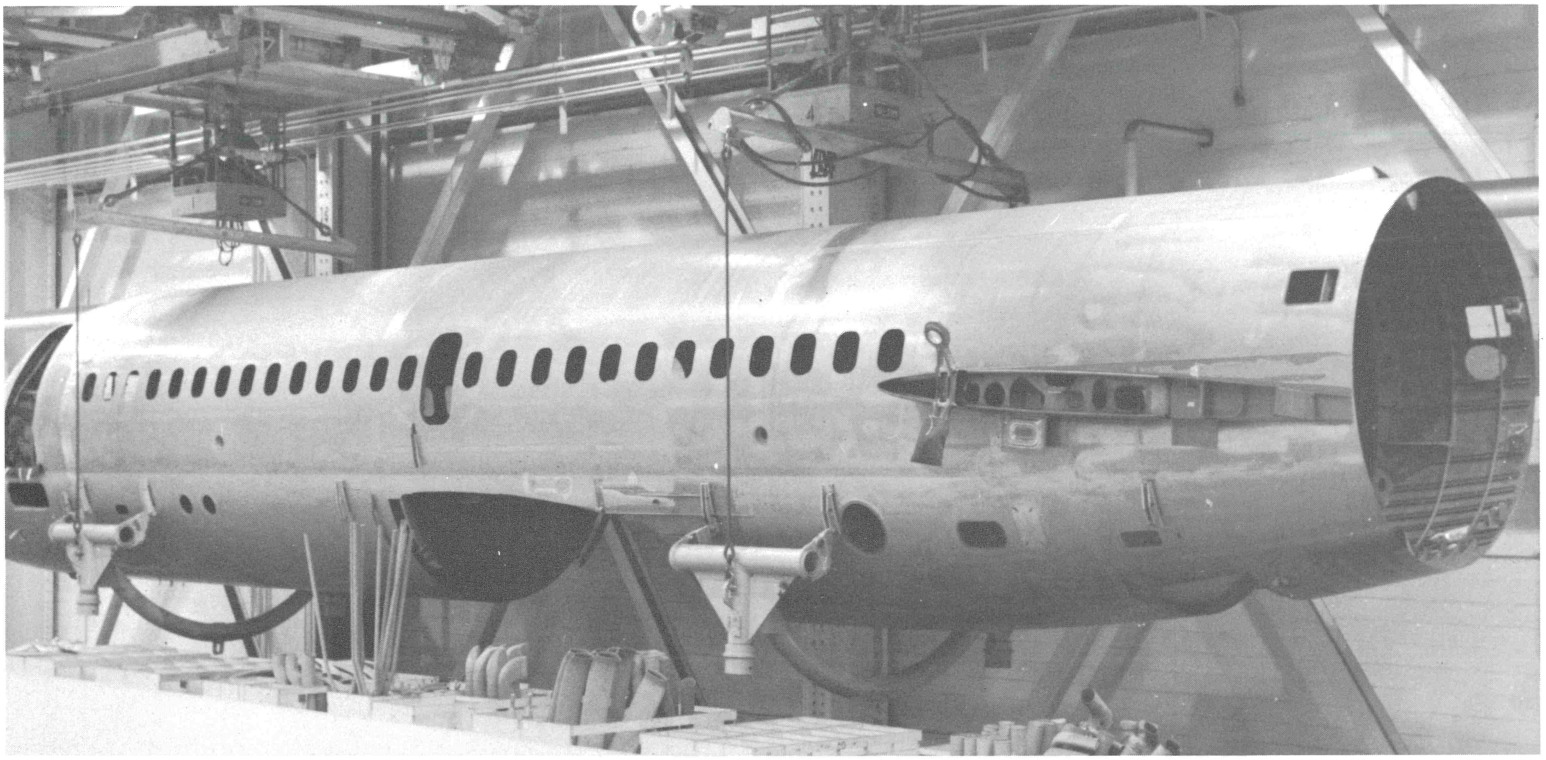


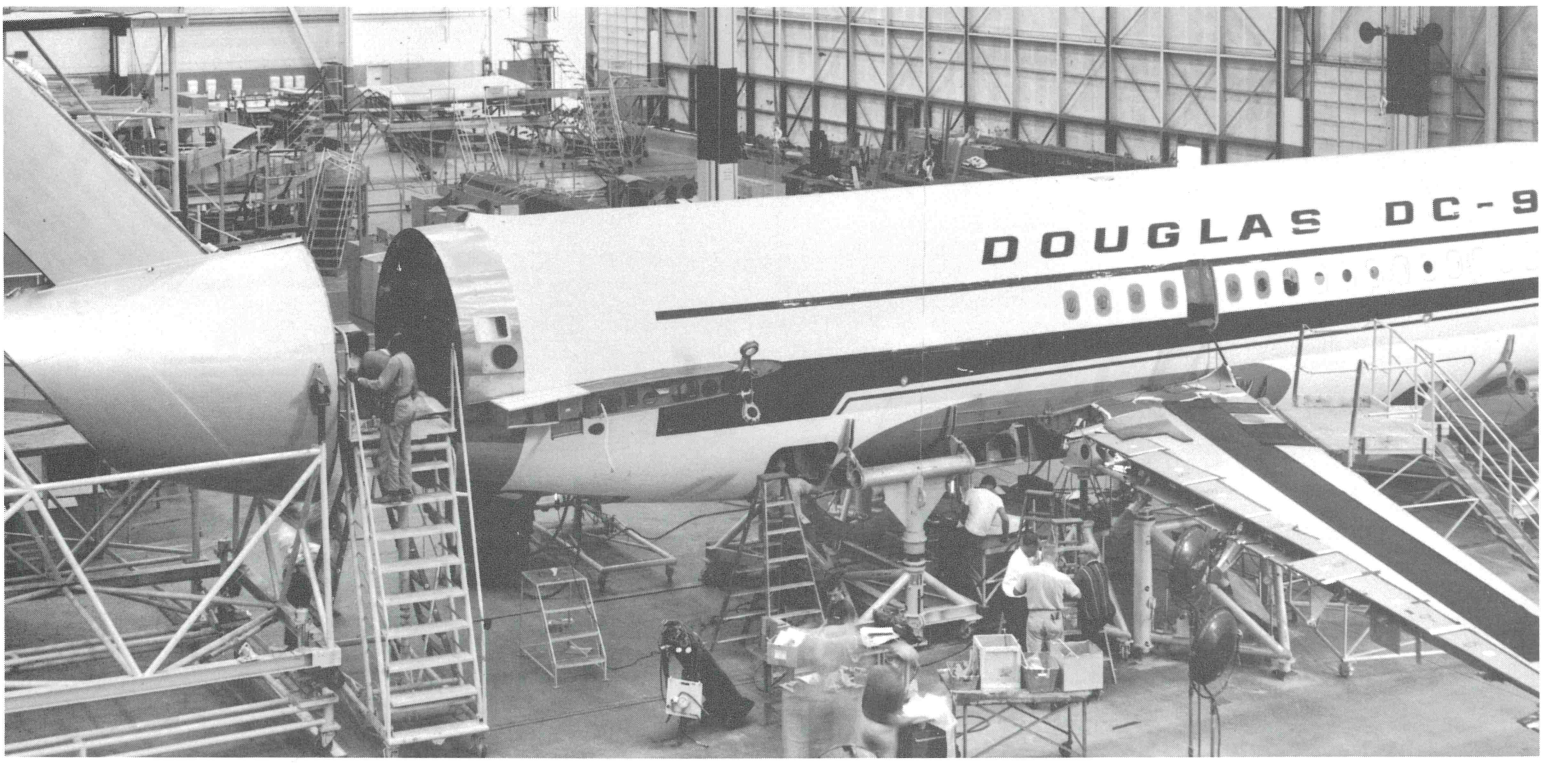


The expert touch is a careful touch

Elsewhere, the fuselage emerges

a tubular cathedral of aluminum





The tail is fitted

then the engines,

Pratt and Whitney's pride and joys,

in a wedding of power to class

The undercarriage

is important, too

Test pilot

THE TEST

A passenger boarding a new commercial airliner is not likely during his entire lifetime to come into contact with any mechanical device which has been more exhaustively tested.

In the case of the DC-9, Douglas Aircraft Company employed testing knowledge acquired during more than thirty-two years of uninterrupted transport production and added a few new techniques to assure integrity of the fledgling airplane.

During his tour of the Douglas facility at Long Beach, Captain O'Grady observed both static (ground) and flight testing procedures for the jetliner he expects to be flying for West Coast Airlines next year.

Laboratory testing of critical structural parts started during the design development phase and before production of the DC-9 began. But it was considered prudent to test the strength of a complete airplane before taking it aloft. While the first DC-9 was being preened for flight, the second aircraft was rigged in a framework of steel girders like a prostrate giant in a huge torture rack. Hydraulic jacks connected to the wings, fuselage and tail by cables and whiffle trees tugged and twisted the airframe with measured forces far greater than those encountered in flight. The tests proved that the DC-9 could withstand relentless torture without damage.

Structure of the new Douglas jetliner has been designed to a criteria of 30,000 hours of flight — more than ten years at eight hours per day — and 40,000 take-offs and landings. In addition to static tests beyond maximum strength limits, the fuselage was immersed in a tank of water to prove its fatigue life through thousands of cycles of pressurization.

Flight development, which began with the initial lift-off on February 25, 1965, has been unusual in some respects. The airplane flown by Douglas test pilots George R. Jansen and Paul J. Patten, unlike many taken up for the first time, was complete in every detail. All of the mechanical, hydraulic and electronic devices required for airline operation of the DC-9 were installed and operable — even the automatic pilot.

This electronic marvel was engaged, as programmed, and operated satisfactorily on the first flight. Douglas knows of no prior instance of using an autopilot on the first flight of a commercial transport. Pilots Jansen and Patten were so satisfied with controllability of the airplane and of autopilot performance during climb and cruise at altitude on their first flight that they attempted a more exacting test.

Flying over the flat expanse of Edwards Air Force Base, Jansen said to Patten, who was in the left hand seat: "Why don't we latch on to the ILS (instrument landing system) and ride her down?"

Patten nodded his assent and at 9,000 feet altitude, coupled the autopilot. "We made a 40-degree intercept to capture the localizer, got a firm grip and came down the glide slope like we were on tracks. At 180 feet we looked at one another somewhat nervously and decided we'd better not go all the way."

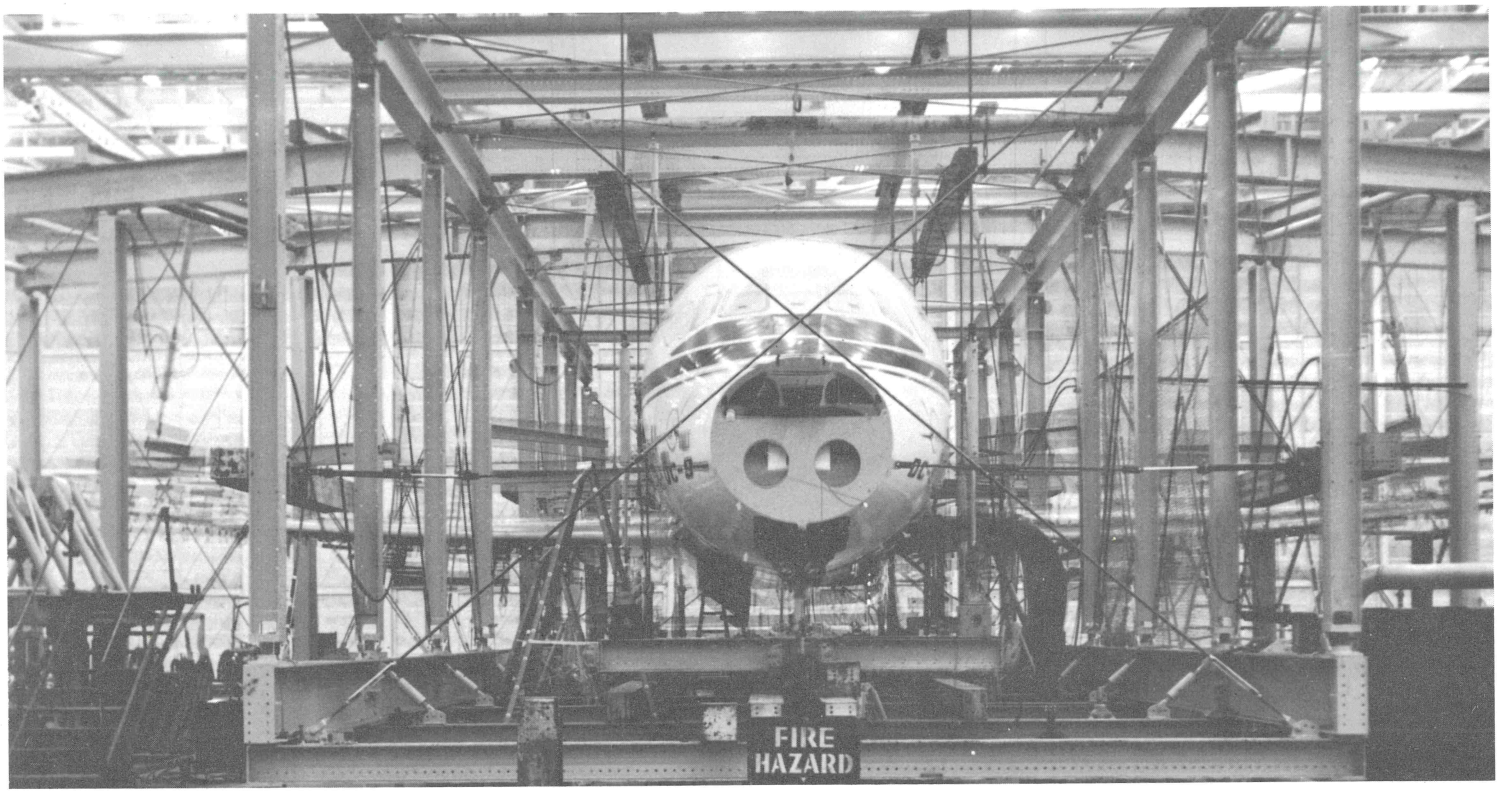
After completing the landing manually, both pilots were enthusiastic about the early compatibility of the airplane and the automatic control system. This success is typical of the flight development program, which is considerably ahead of schedule.

O'Grady watched, with some envy in his eyes, as a DC-9 taxiied out and aimed skyward on one of the many succeeding flights. Then he and Ann Clarke went aboard a companion transport to look over some of the test equipment which filled the cabin.

Four of the first five airplanes built have been used in flight development and instrumented for special phases of the testing program. The fifth is a typical airline model, complete with colorful cabin decor, plush seats and galleys. Its purpose is to demonstrate reliability of the new Douglas jetliner in simulated heavy duty airline operation, particularly in respect to passenger accommodations.

The first airplane has been testing stability and control. Another of its tasks has been to prove the absence of vibration or flutter, which could become destructive, and to demonstrate the ability of the airplane to "dampen" vibrations artificially induced during the tests.

Torture rack



The second airplane was assigned to explore aerodynamic loads in various flight maneuvers, to advance the development of the autopilot, and to test aircraft systems.

The third airplane, loaded with 10,000 pounds of instrumentation and data recording apparatus, is checking fuel consumption performance of the airplane and its powerful Pratt & Whitney engines.

The fourth DC-9 joined the test program in June to prove out the pneumatic, electrical, communications, and navigation systems, as well as ice protection, air conditioning and pressurization features.

O'Grady, as familiar with conditions along routes of West Coast Airlines as he is with the palms of his capable hands, was particularly interested in the thoroughness of the systems tests. He expects the DC-9 to have the superior handling characteristics which are legendary with Douglas transports. He knows that his ability to give his passengers a smooth and uneventful ride every day of every year will depend on the proper functioning of the systems — the hydraulics, and the electrical and electronic devices used for navigation and communication.

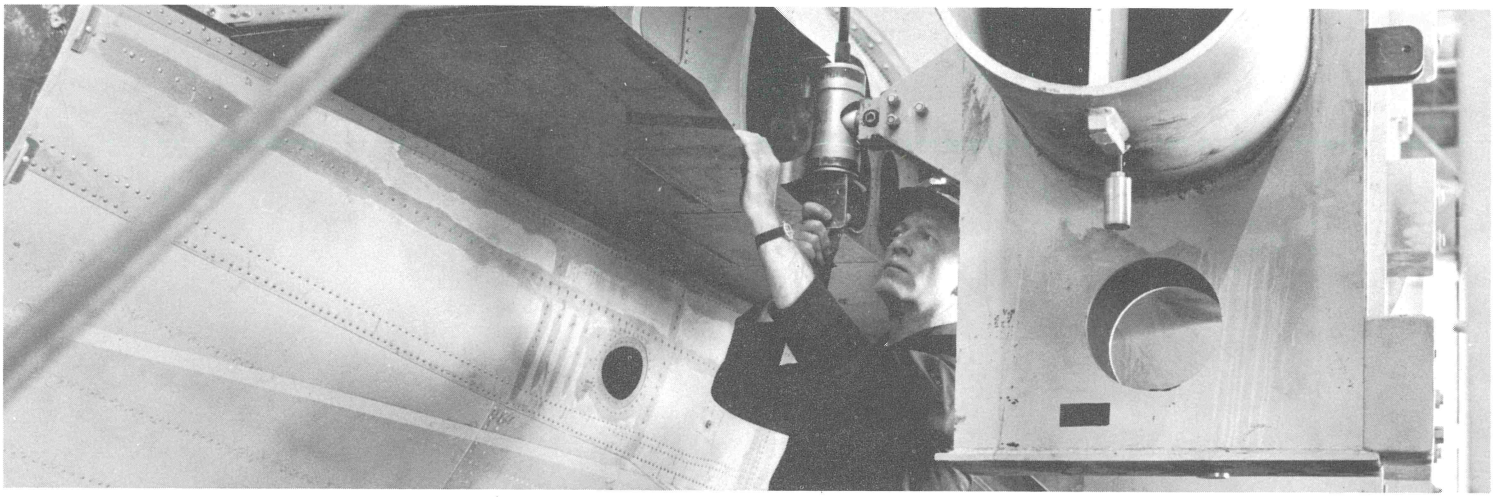
The professional capabilities of O'Grady and other pilots are enhanced by the proper functioning of a good autopilot which can maintain the attitude and altitude of the airplane more precisely than human eyes and hands. Their ability to provide a smooth flight during inclement weather depends also upon a functioning cabin pressurization system which permits them to fly as high as 35,000 feet, with no discomfort to passengers, and on the information given by a weather radar which pinpoints areas to avoid.

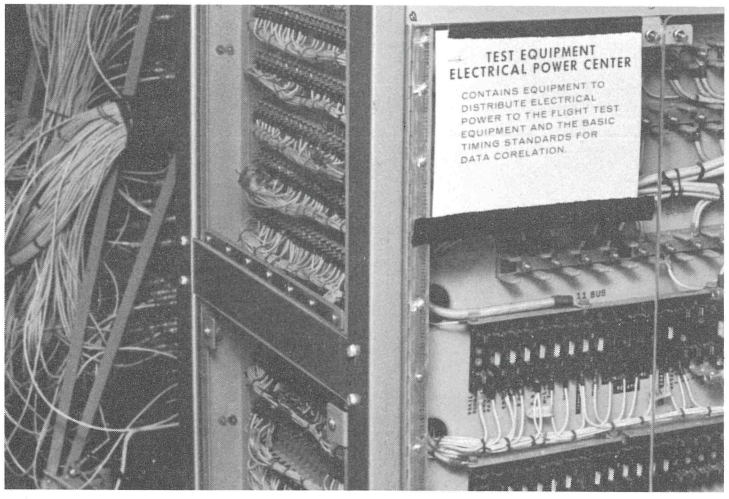
And what about stopping the airplane after touchdown? The flight development program has demonstrated to the considerable satisfaction of test pilots that the thrust reversers alone can stop the DC-9's roll. And the anti-skid braking system keeps the airplane on a straight line when the foot pedals are depressed even with water on the runway.

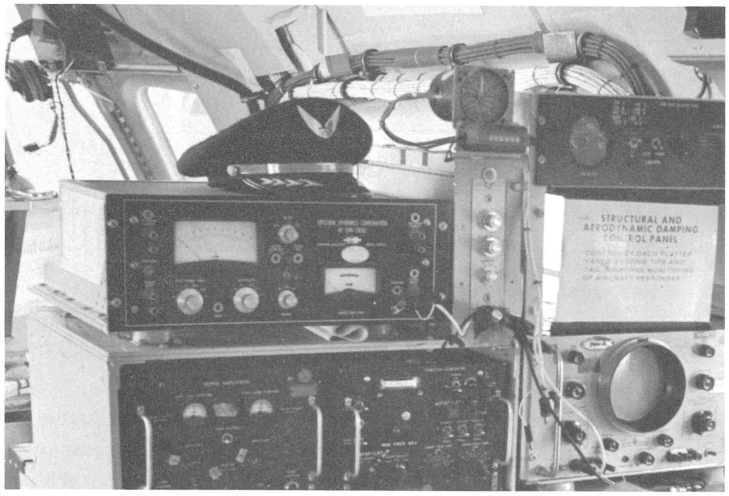
At Douglas, twelve pilots and forty engineers are engaged in the DC-9 flight development program under the direction of John C. Londelius, director, and John P. Hann, engineer. Londelius reports the program is going more smoothly than any in his twenty-two years of flight test experience. But no short cuts will be made.

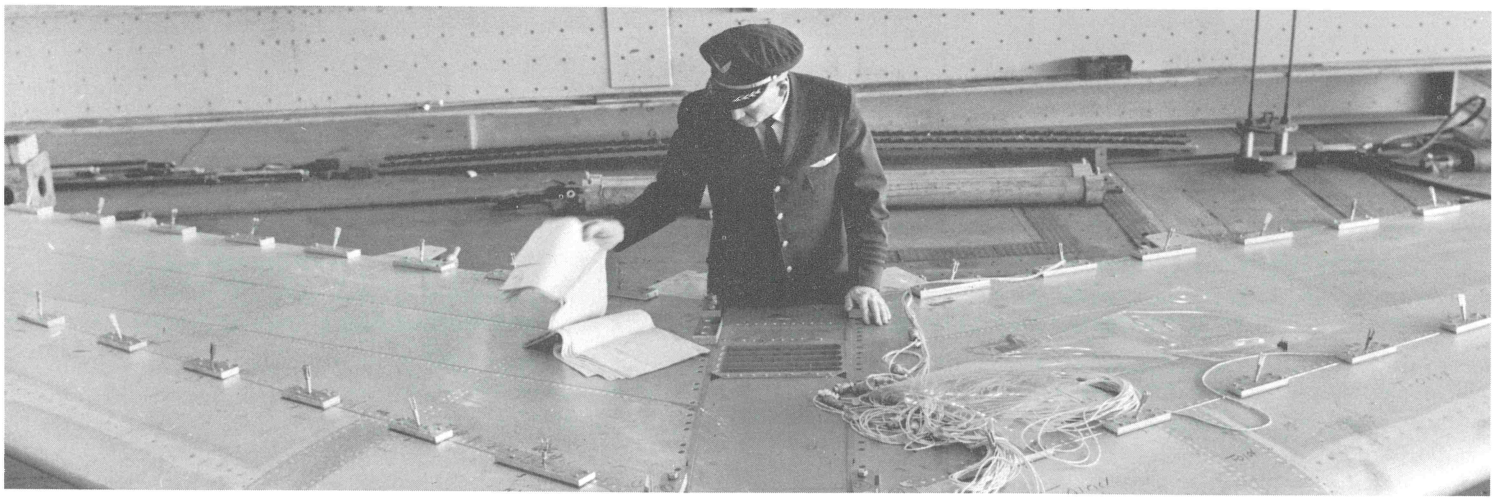
When the first passenger boards the first West Coast Airlines DC-9, it will be as thoroughly tested as any transport can be. And it will be ready for years of reliable service.

Testing the engine shock mount. Weight at right simulates engine




TEST EQUIPMENT
ELECTRICAL POWER CENTER
CONTAINS EQUIPMENT TO DISTRIBUTE ELECTRICAL POWER TO THE FLIGHT TEST EQUIPMENT AND THE BASIC TIMING STANDARDS FOR DATA CORELATION.





Center. Electronic instrumentation used in DC-9 test flights.

Lower: tail rigged for strength test

It is a function of the engine mount to isolate vibration
This set-up measures how well it does

Vertical stabilizer in position for endurance test

comfort in the cabin

A prime objective of Douglas designers, from the day the DC-9 was conceived, has been to provide maximum convenience and comfort for air travelers.

Convenience derives from speed, which is the reason for flying, and from mechanical reliability, which assures reasonable regularity of schedules. The DC-9 has a lot of both.

Comfort, however, is less easily defined. It has different meanings for different people. A sizeable group of Douglas engineers, psychologists, physiologists, architects and others has worked closely with airline customers to determine the variety of details which together spell passenger comfort — in the language of the customer.

Mechanical aspects of comfort are intrinsic to the DC-9's engineering design, but many other important factors are specified by the airlines which will fly the new transport. In the case of West Coast Airlines, the DC-9 cabin will bear the personal stamp of J. Nicholas Bez, Jr., vice president and assistant to the president.

West Coast's unique 75-seat interior was not available for Captain O'Grady and Ann Clarke to inspect, but their tour of the Douglas Long Beach facility included a visit to the styling mockup. This exact replica of the DC-9 cabin is used to develop and demonstrate the many arrangements possible and to display the infinite variety of materials, colors and textures which individualize the interior for each airline.

Ann, whose training has made her as practical as she is pretty, was impressed immediately by the spaciousness of the cabin and "the nice wide aisle," separating rows of three seats abreast on the starboard side, and two on the port side. For demonstration purposes, more than one type of seat was in the mockup and leg-weary visitors gratefully tried them all.

West Coast Airlines has selected a seating style which should appeal to anyone whose freedom of movement has ever been restricted by the seat ahead reclining virtually in his lap. A newly-designed seat permits each passenger to adjust the backrest angle without tilting the back. This is accomplished ingeniously by shifting the bottom of the seat and the lower portion of the backrest forward. The headrest itself remains stationary.

Ann, ever the hostess, was pleased to find that an individual table for meals, snacks, reading or games could be folded down for each passenger. Arm rests may be folded up into the back, if desired.

Good seats, good lighting, roominess and interior decor all contribute to comfort in the DC-9. But some invisible features are equally important. Airplane designers group them together under the term "environmental control" which includes sound, temperature, humidity, and pressurization. Physio-psychologists say the proper balance of these elements has a significant effect on a passenger's feelings of well-being.

Attaining this balance is the result of experience, good design, and — inevitable for aircraft — testing. Comfort in the DC-9 cabin actually began with placement of the powerful jet engines. One reason for locating them at the rear of the airplane was to place their sound far behind the passengers. Acoustical engineers also isolated the interior from the swishing of air rubbing against the outer fuselage at high velocity by construction techniques and by lining the cabin with blankets of sound-soaking fiber glass.

A jet transport may take off from an airport where the ground temperature reads 100 degrees or more and within minutes climb into the sub-stratosphere with a temperature of 65 degrees below zero. These quick changes will not be apparent to the passengers who will loll in living-room comfort, free of cold or hot drafts. The air conditioning system which performs this near miracle must perform to standards unknown in earthbound environments.

To make certain the system would be equal to such a task, Douglas engineers subjected a section of DC-9 fuselage to extremes of temperature from 75 degrees below zero to 160 degrees above. The test section in which company employees sat as "guinea pigs," was instrumented to measure the velocity, direction and quantity of air flowing into the cabin as well as the average temperature.

Pressurized throughout the passenger and baggage compartments, the DC-9 maintains a cabin altitude of 6,000 feet at an aircraft altitude of 30,000 feet. As in the case of fast temperature responsiveness, the pressurization has been developed to suit the nature of short-haul operations.

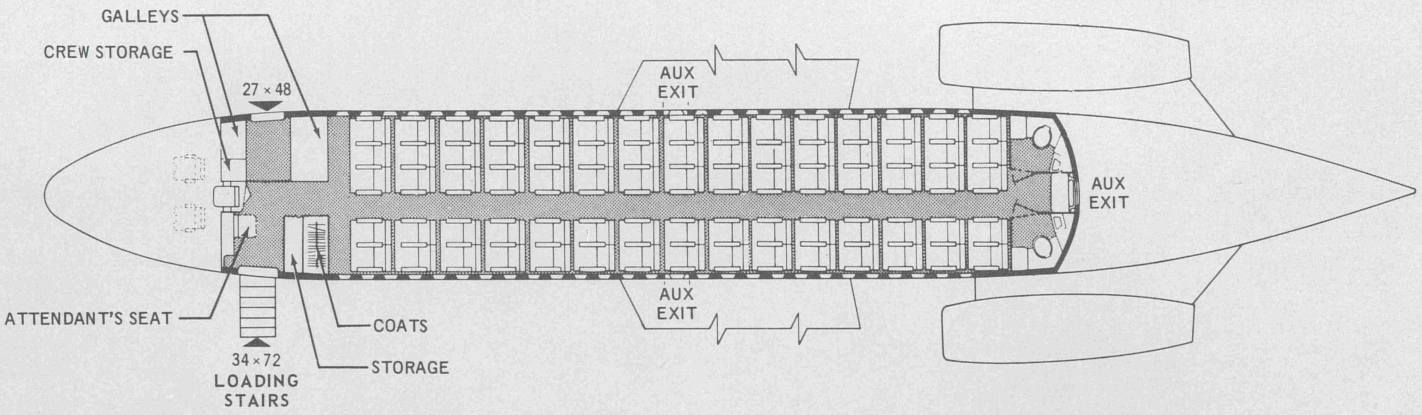
Insulation and soundproofing insure a comfortable cabin

Interior spaciousness appeals to West Coast's tourists, Pat O'Grady and Ann Clarke, at midpoint in their tour
With them is Douglas' cabin specialist, Bob Henderson

The new style seats (left) are a passenger bonus

View towards boarding port and galley

The tilt is gone



Statistics and Interior Arrangement - DC 9

Span - 87.4 feet Length - 104.4 ft. Height - 27.4 feet
Passengers - 75 Speed - 557 mph Range - 1000 miles
Power Plant - Two Pratt & Whitney JT8D fanjets
Take-off thrust - 12,000 lbs. each

and Pat and Ann say: good riddance!

THE FLIGHT DECK

While emphasis in the passenger cabin is on comfort and luxury, functional convenience and reliability are the principal elements in the pilot's compartment or flight deck.

To a layman, the array of dials, meters and other instruments displayed before the pilot and first officer appear bewildering. But to a veteran pilot, like Pat O'Grady, the DC-9 is simplicity itself. This is not by coincidence, but by painstaking, deliberate design.

Flight crews on a long range jet may make no more than two or three takeoffs and landings a day, but the men who fly the DC-9 will be making up to eleven flights daily. So it was essential to develop a cockpit which would make their task as uncomplicated as possible, consistent with safety. The life sciences group of the Douglas Aircraft Division teamed with design engineers and pilots early in the DC-9 program to develop just such a "front office."

The first step was to analyze the cockpits of non-jet aircraft flown by two-man crews on the short-to-medium routes. They studied crew information requirements, panel layouts, components used, layout of work space, the relationship between displays and controls. They compared the best points with known features of the DC-8 cockpit and considered such factors as the pilots' sensory and perceptual processes, motor skills and anthropometrics — scientific labels for human element.

One by one the team established locations for important controls, verifying theory with experimentation in a cockpit mockup. Questions asked again and again were:

"Can this control be used easily by both pilots?

"Are the most frequently used controls nearest at hand?"

"Are controls arranged so the hand moves from one to the other, as required in operation, with no waste motion?"

To make certain the answers were affirmative, they devised an improved method of testing a cockpit arrangement before actual engineering drawings were made and the design, in effect, frozen.

Controls and displays in the mockup were rigged electrically to simulate the functions of a real airplane. As pilots went through the litany of the take-off check list, for instance, they flipped switches, turned knobs, moved levers. Recorded response sounds came through their earphones and appropriate lights blinked off and on in reply to their manipulations. After the takeoff, a concealed operator could simulate emergency by flashing warning lights and sounding signals. Pilots would react immediately with the corrective action required in actual flight.

More than 100 pilots, including many without jet experience, took part in these simulation sessions and offered comments on the arrangement. But the conclusive demonstration was the scientific function-time analysis of hand motions made by the pilots in normal and abnormal situations.

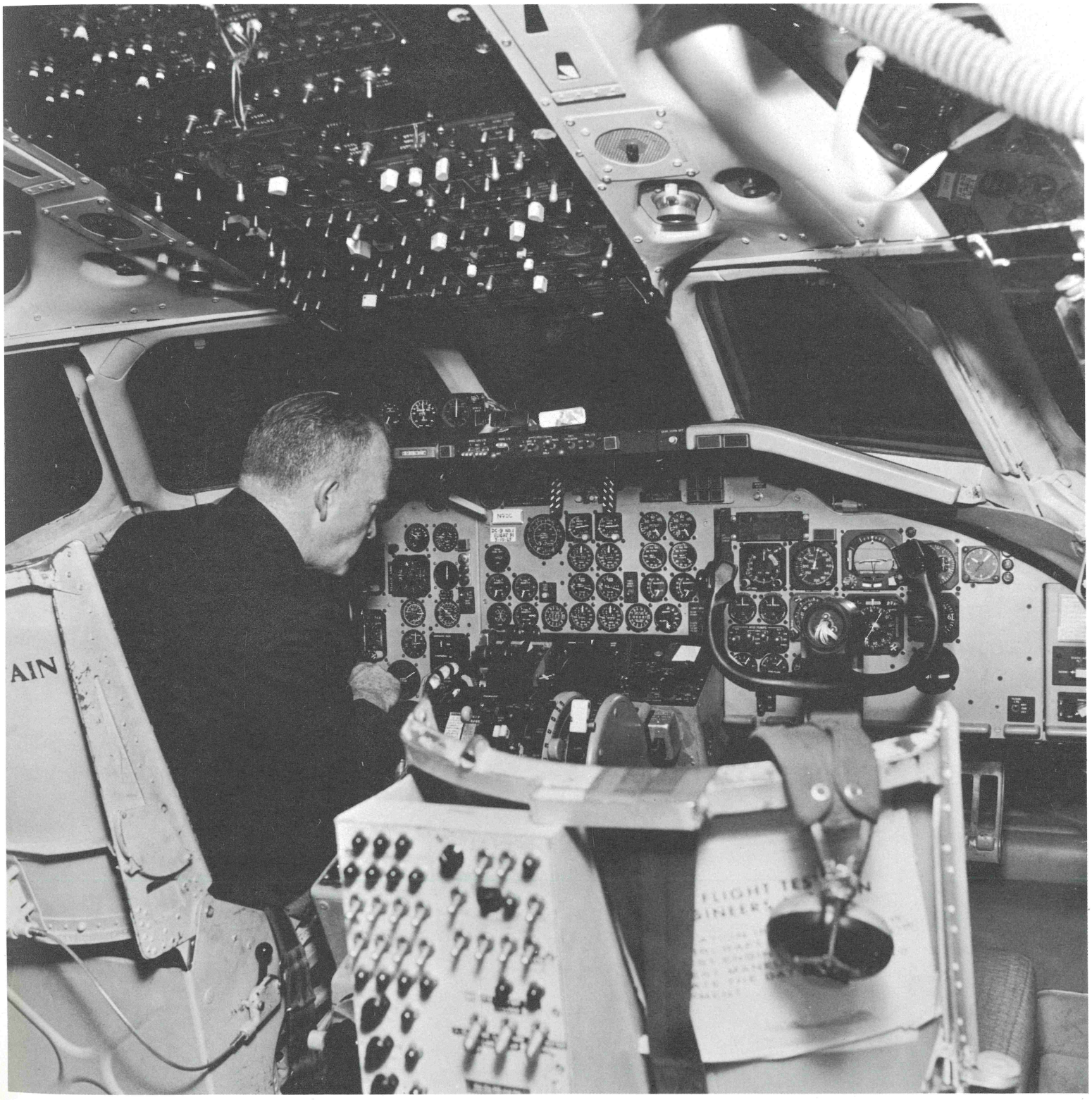
For the test, a micro-miniature incandescent light bulb powered by a six-volt battery was attached to hands of the crew, a red light on the pilot's right hand and a green light on the co-pilot's left hand. An oscillator in the light circuit was set to flash the lights three times a second.

Color motion pictures and still photographs were made as the crew went through their cockpit functions. The pulsed light traced the paths in which their hands moved and dashes of light indicated the time and direction taken to operate each control.

The results proved highly informative, both as to method of testing and for demonstrating efficiency of the cockpit design. Pilots themselves were mildly surprised and obviously pleased to learn how rapidly they were able to react properly to visual and auditory stimuli.

The tests, showed, among other things, that either of the two pilots in the DC-9 will be able to perform all the functions of flight.

Refinements in the DC-9 cockpit and the care with which they were developed are typical of the design details throughout the Douglas jetliner. It seems destined to be favored by pilots and passengers alike when it enters service early in 1966.



EVOLUTION

A familiar sense of excitement and purpose came through the hubbub and clatter of the DC-9 production line as Captain Pat O'Grady approached the final assembly area. The sleek jet transports lined up in military precision at the far end of the hangar made it complete.

O'Grady traversed two decades in a twinkling. The time he recalled was nearly 22 years before and the place was the Army Air Transport Command base on the opposite side of Long Beach Airport.

Looking across the airfield at dusk, he often had seen the huge Douglas hangar doors roll back on a scene similar to the one before him. One after another, military versions of the most advanced twin-engine transport of the day emerged, ready for delivery by O'Grady and his fellow ferry pilots.

The plane then was the C-47, which Douglas was producing by the hundreds, and later by the thousands. Like its civilian counterpart, the dependable DC-3 airliner, the C-47 was the workhorse transport, hauling supplies, ammunition, ordnance and priority personnel on every front. More than 10,000 of the military DC-3s saw service, whether known as the C-47 Skytrain, the Navy R4D, Royal Air Force Dakota or the universal generic "Gooney Bird."

Almost simultaneously came the Douglas C-54, originally designed as the DC-4, a four-engine transport roughly three times the size of its predecessor. Ordered by airlines for delivery in 1942, the DC-4 was drafted into military service and commissioned as the C-54 Skymaster.

More than 1,100 Skymasters followed the first one into warpaint, airlifting the burden from the back of the Himalayan Hump and shuttling troops and supplies from continent to continent. A specially fitted C-54 achieved lasting fame as the "Sacred Cow," the first aircraft designed for the service of the President of the United States.

Commercial airlines finally received delivery of DC-4s after the shooting stopped, while military versions continued to meet the equally difficult demands of a colder conflict. In 1948 and 1949, Air Force Skymasters virtually single-handedly performed the supply miracle of the Berlin Airlift.

Numerically next in the Douglas transport family, the DC-5 paradoxically was produced before the DC-4. Designed at about the same time, the '5' came off the line first because of its many similarities to the '3'. It also was a twin-engine transport, but somewhat larger than the 3, and with a high-wing configuration and a tricycle landing gear. Most of the twelve which were manufactured were pressed into military service, principally in the Pacific.

In November, 1946, Douglas delivered the first DC-6, a bigger, faster pressurized descendant of the Douglas commercial line. The DC-6 was the first airliner to cruise in the 300 mile-an-hour range, and the first with cabin altitude control providing passengers with 5,000-foot altitude comfort while flying at 20,000 feet.

Again the military air experts gave a testimonial nod to Douglas by selecting an Air Force version of the DC-6 for Presidential use. The C-118A "Independence" succeeded the C-54 "Sacred Cow."

The DC-7 in May, 1953, demonstrated the capacity for growth in basic Douglas design. More powerful engines pushed its top speed to more than 400 miles an hour, making it possible for U.S. trunk airlines to offer realistic nonstop transcontinental schedules. Two more models of the DC-7 followed, including the DC-7C with a larger wing span and increased fuel space for nonstop intercontinental operations.

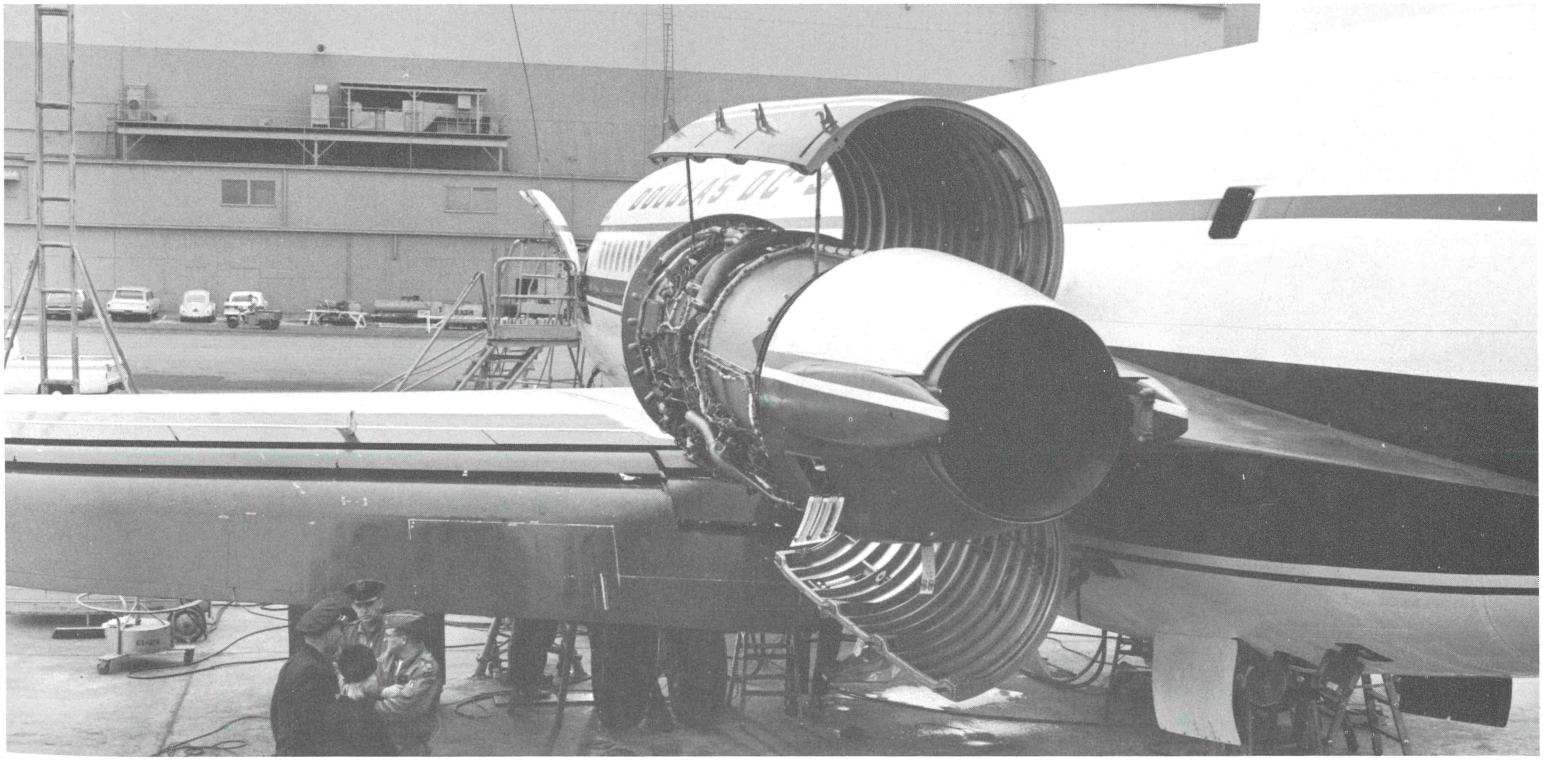
A year before the introduction of the DC-7, Douglas engineers quietly established a special project office. It was three years before they disclosed the purpose of the project: the design of the DC-8 jetliner, a transport as far advanced over the DC-7 as the 7 was over the 3.

In May, 1958, the first DC-8 lifted gracefully off the Long Beach Airport runway. Succeeding models soared aloft to set new and higher standards of speed and comfort in air travel, shrinking oceans and continents to the span of a few hours. In half a decade, DC-8 performance smashed all commercial records for speed, altitude, distance and payload capacity. By 1963, smooth jet power virtually had eliminated pistons and props on long routes.

In that year Douglas planners decided to extend jet-age advantages to short and medium-haul airlines, linking home towns with metropolitan areas. The result of that decision and more than thirty years of transport design experience was the fanjet DC-9, one-third the size of the DC-8 and with half as many engines, but capable of flying in the same speed ranges (550 mph) and with the same level of passenger comfort.

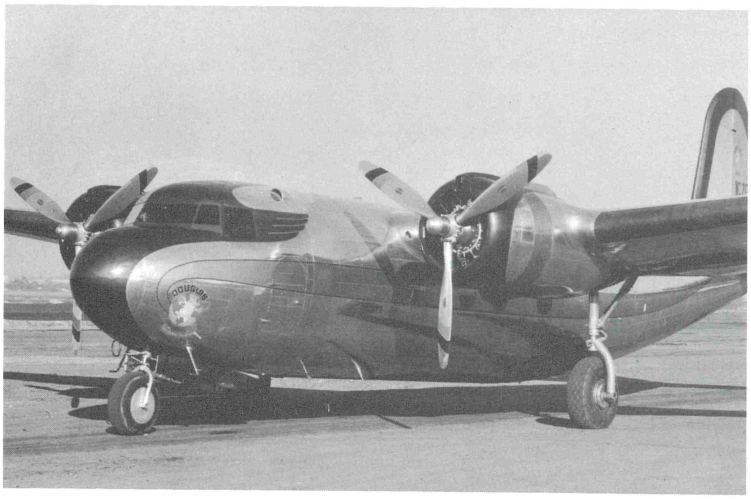
This was the fulfillment of the jet-age promise Captain O'Grady had come to see. He wanted to be ready for the day when a DC-9 in the colors of West Coast Airlines would roll off the assembly line. It seemed in the cards that once again he would be called on to take the controls on the delivery flight of a twin-engine Douglas transport, twenty years after participating in the inaugural West Coast Airlines flight out of Seattle in a warbuilt DC-3.

— Herb Shannon



Two DC-9s undergo final preflight adjustments alongside big brother 8s

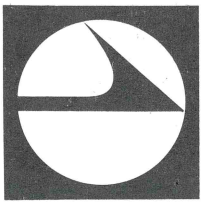
the douglas family



Top to bottom: 3, 4, 5

6, 7, 8

The original Douglas 9 above; number three below



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